

Jacek Józef NOWAKOWSKI

Changes in the breeding avifauna of Olsztyn (NE Poland) in the years 1968–1993

Nowakowski J.J. 1996. Changes in the breeding avifauna of Olsztyn (NE Poland) in the years 1968–1993. *Acta orn.* 31: 39–44.

Abstract. This study compares the present (1991–1993) breeding avifauna from the city of Olsztyn with that in the years 1954–1968. Habitats changed significantly over the 25-year interval. A rise in the human population was associated with the expansion of residential and industrial districts and a consequent contraction of natural areas. Changes occurred between 1968 and 1993 in the diversity and dominance structure of the breeding avifauna. *Chlidonias niger*, *Tringa totanus*, *Upupa epops*, *Luscinia svecica*, *Galerida cristata* and *Corvus frugilegus* were lost from the city, while an additional 15 species declined. Nine species are currently endangered in the city, and will probably disappear in the near future. Urbanization meanwhile has favored 11 species that inhabit built-up areas or are undergoing synurbization. The appearance of *Aythya ferina*, *Bucephala clangula*, *Mergus merganser* and *Columbia livia domestica* as new breeding species reflects general trends towards increased populations in both Poland and the continent as a whole.

Key words: bird communities, urban environment, urban birds, changes of avifauna, Olsztyn

Dept. of Ecology and Environm. Protection, Teachers Training College, Żołnierska 14, 10–561 Olsztyn, POLAND

Received — Oct. 1994, accepted — May 1995

INTRODUCTION

The first references to observations of birds in Olsztyn date back to the beginning of the 19th century according to Tischler (1941). In the post-War period two more important studies were published describing the birds of the city. These were the avifauna of Olsztyn's suburban woods described by Karczewski & Wengris (1963), and the results of faunal observations made in the city and its surroundings during the period from 1954–1968 (Okulewicz 1971).

The aim of the present work is to compare the current status of the city's avifauna with that in the period 1954–1968, as well as to evaluate trends in the changes that occurred over that interval.

STUDY AREA AND ITS CHANGES

Olsztyn (Fig. 1) covers an area of 88 km² and has a population of 166 000 inhabitants. Its area is 50 per-cent built-up with nearly half of this "villa" type developments. There are three forest complexes within the administrative boundaries of the city (Las Miejski covering 1050ha, the 250ha forest near Lake Ukiel and the 150-ha Las Kortowski). There are also many smaller forest fragments covering a total of about 600ha., as well as park-like areas of trees including 54.6ha of parks and 36.3ha of old cemeteries. The city has 11 lakes, of which the three largest cover 441, 101 and 94ha respectively. In the peripheral areas of the city, and areas between housing estates, there are open habitats composed of fields, meadows or

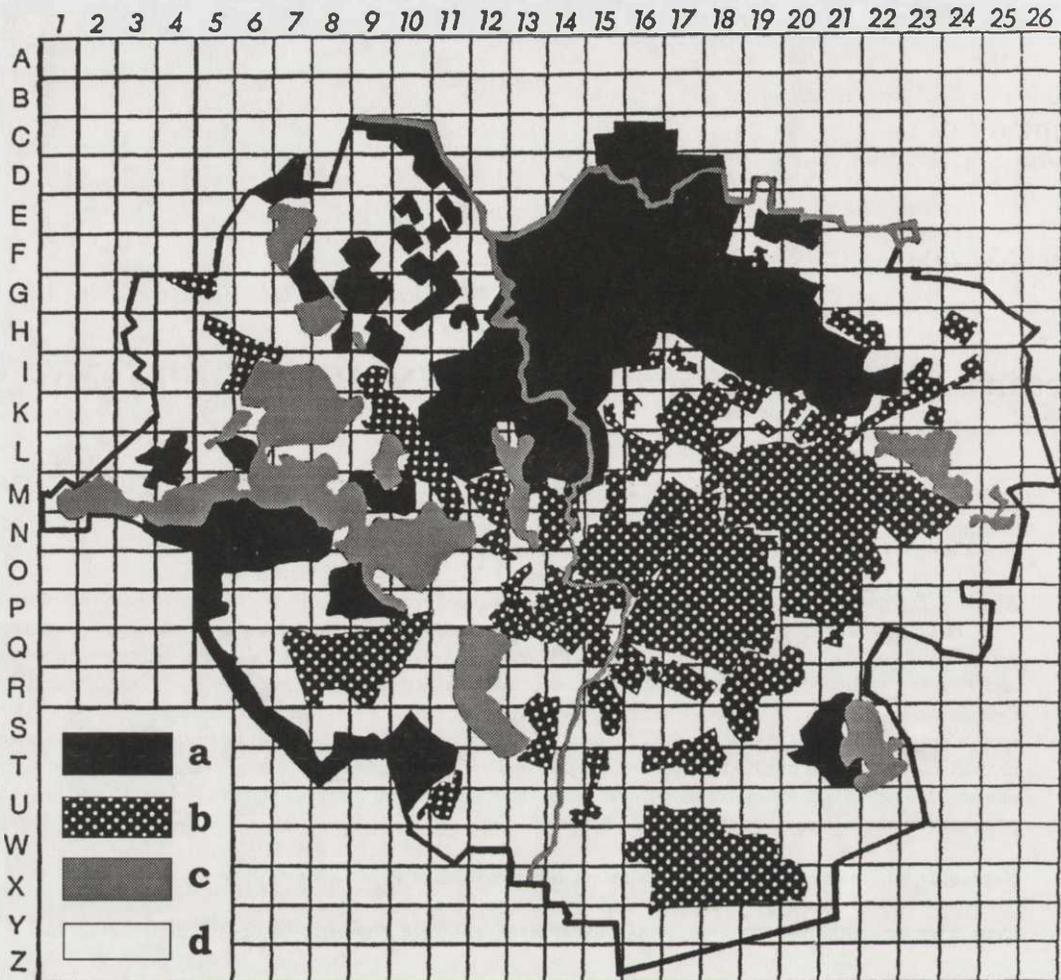


Fig. 1. Municipal area of Olsztyn. Distribution of main habitats: a — forests and woods, b — built-up areas, c — lakes, d — open landscape.

[Ryc. 1. Rozmieszczenie głównych biotopów na obszarze administracyjnym Olsztyna: a — lasy i zadrzewienia, b — zabudowa, c — jeziora, d — tereny odkryte.]

wasteland types that are often marshy. There are also many small bodies of water with reedbeds in varying stages of development. The Łyna and the Wadag rivers flow through the city.

Comparisons of the present city of Olsztyn with the city as it was in 1954–1968 show significant changes. The area grew to include what were once suburbs and surrounding villages as it expanded from 46 to 88 km². There was a distinct rise in the percentage of built up area as industrial areas increased, and as small housing estates were replaced with blocks and villas. New residential areas included both housing estates and suburban homes, and in the 1970s the Track Reservoir (53ha) was built. In the period from 1968–1993 the population increased from about 80 000 to about 166 000. Through this period changes in land use

reduced the amount of open habitats (e.g., fields, meadows and derelict land) between the city and the river Łyna. The forested area declined and some forests became fragmented, while the banks of lakes and the River Łyna experienced degradation. Many wetland or marshy areas were drained and otherwise brought into economic use as allotments or built-up areas.

METHODS

The research was conducted during 1991–1993 by 11 people working within the present administrative boundaries of the city. Data collection was based on a form of the mapping method modified for urban conditions (Tomiałojć 1968). Counts were made at

dawn and dusk within a 500m grid covering the total area of Olsztyn (Fig. 1). Research was carried out between mid-March and the beginning of July each year. Quantitative counts in the years 1991–1992 were restricted to sample plots in built-up areas and on lakes (with 6–9 checks made). Counts in other built-up areas and at lakes were qualitative in nature, with species recorded in four checks. In contrast, the four checks in 1993 were based on counts made throughout the city with note taken during each, of the sites with singing males or nests. In addition, tape recordings were made at night at sites where certain nocturnal species occurred (e.g., *Caprimulgus europaeus*, *Crex crex*, *Rallus aquaticus* and *Porzana spp.*). Some selected grid squares were specially checked for the presence of uncommon breeding species, or species that start breeding late in the year.

The results of this research were compared with data for Olsztyn from the years 1954–1968, which were obtained from the work by Okulewicz (1971). It was not possible to do an exact analysis of changes in the populations of individual species, because the aforementioned author did not cite numbers of breeding pairs in the majority of cases. Thus it was necessary to restrict evaluations of the status of species to such broad categories as “very abundant”, “common”, “uncommon” or “rare”. The discussion below is thus centred on changes within the group of birds inhabiting the city that are great enough to be recognized by a change of status from one of the aforementioned groups to another.

CHANGES IN THE AVIFAUNA

The inventory of Olsztyn from years 1991–1993 revealed the presence of some 155 species of birds, of which 126 bred, or probably bred (author's data).

In contrast, the data from 1954–1968 referred to the occurrence of 68 species that were breeding or probably breeding. By including the data from Las Miejski, which is now within the administrative boundaries of the city, the figure increases to 112 breeding species. In addition, certain species in the earlier inventory can not be excluded from the list of breeding birds because they were actually observed in the breeding season. The cases in point here are *Accipiter gentilis*, *Accipiter nisus*, *Falco subbuteo*, *Buteo*

buteo, *Turdus viscivorus*, *Turdus iliacus*, *Perdix perdix*, *Scolopax rusticola* and *Locustella naevia*; which all nest today in a very small number of sites in natural biotopes within the city boundaries.

Comparison of species composition and numerical representation indicate that quite significant changes occurred during the 25-year time interval. These included changes in population sizes, in the dominance structure and in the identities of the species present.

Species that have disappeared

Table 1 details the 6 species that were lost to the city during the 25 year interval. The Short-toed Treecreeper *Certhia brachydactyla* is an additional example of a species cited as present in the earlier study by Okulewicz (1971), but was not recorded in the more recent research. Nevertheless, this is a species at the limits of its range whose presence within Olsztyn may be conditioned by overall trends in the population dynamics of the species. 1–2 pairs did in fact breed in Las Kortowski in both 1986 and 1989, as well as more continuously in earlier years (1982–1985). Indeed, single individuals at the same site have also been noted in the course of recent breeding seasons (unpublished author's data).

Table 1. Species that have disappeared from the city.

[Tabela 1. Gatunki, które ustąpiły z miasta.]

Species	Status of species in the years 1954–1968
<i>Chlidonias niger</i>	1953–1958 — 2 breeding colonies
<i>Tringa totanus</i>	1953–1958 — 3 pairs breeding in the floodplains
<i>Upupa epops</i>	1950's — occurred frequently in the city's forested areas, 1956 — 1 pair breeding
<i>Luscinia svecica</i>	1954–1968 — rare breeding species
<i>Galerida cristata</i>	1954–1968 — rare breeding species
<i>Corvus frugilegus</i>	1954–1968 — 1 breeding colony

Species that have declined

Several species that are today rare and/or declining or experiencing contractions in ranges were considered quite common in the earlier period. They occurred in natural biotopes now included within the city, or in natural habitats between built-up areas. The species in question are *Crex crex* (3p.), *Anthus pratensis* (49p.), *Anthus trivialis* (110p.), *Alauda arvensis* (212p.), *Motacilla*

flava (68p.), *Lullula arborea* (13p.), *Perdix perdix* (45p.), *Vanellus vanellus* (21p.), *Rallus aquaticus* (15p.), *Porzana porzana* (6p.) and *Locustella luscinioides* (16p.). Population declines were also noted for three formerly-common species associated with trees or forests, namely *Jynx torquilla* (1p.), *Streptopelia turtur* (9p.) and *Muscicapa striata* (34p.). Recent years populations of the thrush nightingale *Luscinia luscinia* declined, with many of the previously occupied areas now abandoned (author's data).

Endangered species

Some species are threatened because they are likely to disappear from it in the near future. These species are represented by only a few pairs, that nest in biotopes threatened by change. These species include *Anas crecca* (3p.), *Anas strepera* (4p.), *Gallinula chloropus* (3p.), *Tringa ochropus* (8p.), *Scolopax rusticola* (6p.), *Caprimulgus europaeus* (7p.), *Columba oenas* (4p.), *Lanius collurio* (50p.) and *Lullula arborea* (13p.).

New breeding species

Five new species joined the community of breeding birds in the last 25 years (Tab. 2). Four of these (*Aythya ferina*, *Bucephala clangula*, *Mergus merganser* and *Turdus pilaris*) are species with expanding national populations and expanding ranges (Tomiałojć 1990). These were formerly rare species in the Olsztyn area (Okulewicz

Table 2. New breeding species colonizing Olsztyn during the period 1968–1993 with the number of breeding pairs in 1993.

[Tabela 2. Gatunki, które zaczęły gnieździć się w Olsztynie w okresie 1968–1993 i liczba par lęgowych w roku 1993.]

Species	Pairs
<i>Aythya ferina</i>	6
<i>Bucephala clangula</i>	4
<i>Mergus merganser</i>	5
<i>Columba livia f. domestica</i>	730
<i>Turdus pilaris</i>	260

1971). Tischler (1941) gave no sites for the *Mergus merganser* in the Olsztyn area, but the first nest was found in 1947 (Okulewicz 1971). In the early study (1954–1968) the *Turdus pilaris* was only observed while on migration, or in winter (Okulewicz 1971). In contrast, it now nests in open areas with trees, and is slowly spreading from peripheral areas towards the

centre of the city. The Feral Pigeon *Columba livia f. domestica* was still not present in Olsztyn in 1968, but it has since settled in the city becoming one of the commonest birds in built-up areas.

Species that are increasing

Over the 25 year interval since the early inventory populations of 11 species increased significantly (Tab. 3). First and foremost, these are species associated with buildings. Thus, populations of *Corvus monedula* increased sharply from one pair in 1955 (Okulewicz 1971) to the point where the species is now one of the most abundant in the built-up areas of the city. Numbers of *Streptopelia decaocto*, *Phoenicurus ochruros* and *Oenanthe oenanthe* increased similarly, while a local group of Barn Swallows *Hirundo rustica* is now nesting in buildings of the city centre.

Sizes of the breeding populations also increased for *Cygnus olor*, *Anas platyrhynchos*, *Fulica atra*, *Columba palumbus*, *Garrulus glandarius*, *Pica pica* and *Pyrrula pyrrhula*. Mute Swans, Mallards and Common Coots inhabit the lakes as well as the many small bodies of water within the city, the broad meanders of the river and even the built-up areas.

The Common Wood Pigeon, Eurasian Jay and Common Bullfinch nest not only in forests, but also in some small areas of urban green space like allotments, parks, cemeteries, gardens and suburbs close to forested areas. In the 1950s, the Black-billed Magpie was a rare breeding species in the Olsztyn area, especially around the city itself (Tischler 1941). However, in the 1960s and 1970s, it began to slowly colonize the peripheral areas of the city (Okulewicz 1971), and it is now one of the subdominant species in the breeding community of the city proper.

Changes in the dominance structure of the avifaunal community in Olsztyn between the years 1968 and 1993

A treatment of the changes observed in the city's avifauna should also address changes in the dominance structure of the group of breeding birds inhabiting the built-up areas of the city. In the late 1960s and early 1970s, the commonest birds in this group were: *Passer domesticus*, *Apus apus*, *Sturnus vulgaris*, *Carduelis chloris*, *Passer montanus*, *Fringilla coelebs*, *Phoenicurus phoenicurus*, *Parus major*, *Pica pica* and *Serinus serinus* (Okulewicz 1971). Today the same

area is dominated by the following species (in order of decreasing abundance): *Passer domesticus*, *Streptopelia decaocto*, *Columba livia f. domestica*, *Apus apus*, *Pica pica*, *Parus major*, *Fringilla coelebs*, *Sturnus vulgaris*, *Phoenicurus phoenicurus* and *Carduelis chloris*. The work by Dulisz and Nowakowski (1996) gives the dominance amongst avifaunal groups inhabiting the different types of built-up area in Olsztyn.

Table 3. Species increasing their populations.

[Tabela 3. Gatunki, które wykazały wzrost liczebności.]

Species	1954–1968	1993
<i>Cygnus olor</i>	1953–1958 — 1–3 p.	27 p.
<i>Anas platyrhynchos</i>	1954–1968 — ~ 10 p.	170 p
<i>Fulica atra</i>	1954–1968 — common breeding sp.	115 p.
<i>Columba palumbus</i>	1956 — 9 p.	44 p.
<i>Garrulus glandarius</i>	1954–1968 — breeding only in forest	120p., some nests in city areas, parks, cemeteries, small forested area
<i>Pica pica</i>	1950's not numerous	302 p.
<i>Pyrrhula pyrrhula</i>	1954–1968 — breeding only in forest	97p., 5p. in city garden, parks and cemeteries
<i>Streptopelia decaocto</i>	1960 — first nesting	930 p.
<i>Phoenicurus ochruros</i>	1954–1968 — not frequent	119 p.
<i>Corvus monedula</i>	1955 — 1 p.	800 p.
<i>Oenanthe oenanthe</i>	1954–1968 — ~ 10 p.	64 p

FACTORS INFLUENCING CHANGES

It is possible to define the factors that had a significant influence on the changes in the breeding avifauna identified by this study. To do this it was necessary to: (1) consider the inventory of Olsztyn's avifauna provided by this study, (2) characterize the assemblages of breeding birds in different urban habitats from the author's unpublished data, (3) identify known changes in the city's environment, and (4) determine the influence of the above factors on the characteristics of assemblages of breeding birds.

The following factors may be considered to have led to increases in the populations of species nesting in the city, as well as to the colonization of the city by new species:

1. Overall (Poland-wide or regional) changes in population dynamics (noted for species like *Turdus pilaris*, *Aythya ferina*, *Bucephala clangula* and *Mergus merganser*).

2. The geographical expansion of some species (like *Columba palumbus*, *Streptopelia decaocto* and *Serinus serinus*).

3. An increase in the proportion of the city that is built-up (encouraging increases in the populations of species nesting on buildings like *Columba livia f. domestica*, *Apus apus*, *Corvus monedula*, *Phoenicurus ochruros*, *Passer domesticus*, *Oenanthe oenanthe*, *Sturnus vulgaris* and *Delichon urbica*).

4. The progressing synurbization of local populations (species like *Pyrrhula pyrrhula*, *Garrulus glandarius* and *Hirundo rustica*, that continue to breed in typical habitats, but are also invading urban green space, allotments and even more atypical habitats).

5. The provision of food by humans (which has probably had a significant role in the increases observed for *Anas platyrhynchos*, *Pica pica* and *Garrulus glandarius*).

In turn, the following factors may be responsible for the retreat of several species that formerly inhabited the city, and for the declines observed in the breeding populations of others:

1. Overall changes in the dynamics of national populations (e.g. for *Jynx torquilla*, *Upupa epops* and *Streptopelia turtur*).

2. Reductions in the sizes of open areas and the penetration of natural biotopes by humans (a factor in the decline and retreat from the city of *Crex crex*, *Gallinago gallinago*, *Vanellus vanellus*, *Rallus aquaticus*, *Alauda arvensis*, *Lullula arborea*, *Anthus spp.*, *Motacilla flava* and *Locustella naevia*).

3. The real reduction and fragmentation of forests, the removal of old trees and the penetration of forests near housing estates by humans (factors in the decline of species associated with these biotopes).

4. The degradation of areas of scrub (leading to the retreat of *Luscinia luscinia* and *Sylvia spp.*).

5. The degradation of the banks and shores of bodies of water (bringing about the disappearance of breeding colonies of *Chlidonias nigra*, and the declines noted in populations of *Locustella luscinioides*, *Acrocephalus spp.* and *Remiz pendulinus*).

REFERENCES

- Dulisz B., Nowakowski J.J. 1996. Breeding bird communities in urban built up habitats of Olsztyn city (NE Poland). *Acta orn.* 30: 33–38.
- Karczewski Z., Wengris J. 1963. Awifauna lasu podmiejskiego w Olsztynie, ze szczególnym uwzględnieniem rezerwatów Mszar i Redykajny. *Zesz. Nauk. WSR w Olsztynie.* 15: 215–222.
- Okulewicz J. 1971. Birds of Olsztyn and its vicinity. *Acta orn.* 13: 127–172.
- Tischler F. 1941. Die Vogel Ostpreussens und seiner Nachbargebiete. I–II. Konongsberg/Berlin.
- Tomiałojć L. 1968. [Fundamental methods of the quantitative research of the breeding avifauna on woodcovered areas and in settlements.] *Not. orn.* 9: 1–20.
- Tomiałojć L. 1990. [The birds of Poland their distribution and abundance.] PWN. Warszawa.

PODZIĘKOWANIE

Autor pracy składa serdeczne podziękowania koleżankom i kolegom: B. Dulisz, E. Żukowskiej, H. Gutowieckiej, K. Kuczyńskiej, L. Pruszczyk, K. Lewandowskiemu, W. Marterowi, M. Sobierajowi, P. Nowogórskiemu, M. Kaszubie za ich pracę terenową, bez której nie byłoby możliwe zebranie powyższego materiału. Badania w roku 1993 finansowane były przez Urząd Miasta w ramach problemu OSL.I. 862/F-2–93.

STRESZCZENIE

[Zmiany awifauny lęgowej Olsztyna w ciągu ostatnich 25 lat]

Badania prowadzone były w latach 1991–1993, przez 11 osób w obecnych granicach administracyjnych miasta, przy użyciu metody kartograficznej. Liczenia były dokonywane w polach (500x500m) siatki kartograficznej pokrywającej teren Olsztyna (ryc. 1). Wyniki badań porównano z danymi dotyczącymi miasta z lat 1954–1968 zamieszczonymi w pracy Okulewicza (1971).

W porównaniu z okresem lat 1954–1968, na terenie miasta zaszły istotne zmiany: powierzchnia miasta powiększyła się z 46 do 88 km², nastąpił wyraźny wzrost udziału terenów zabudowanych, powstał zbiornik Track, liczba mieszkańców wzrosła z ok. 80 tys do ok. 166 tys., zmniejszyła się powierzchnia licznych wówczas terenów otwartych rozmieszczo-

nych między obszarami zabudowanymi oraz wzdłuż rzeki Łyny, nastąpił spadek powierzchni leśnych oraz degradacja brzegów jezior i rzeki Łyny.

Inwentaryzacja przeprowadzona w latach 1991–1993 wykazała występowanie na terenie Olsztyna 155 gatunków ptaków, w tym 126 gatunków lęgowych lub prawdopodobnie lęgowych.

W badanym okresie z terenu miasta ustąpiło 6 gatunków ptaków (tab. 1), a 15 gatunków występujących dawniej dość licznie w naturalnych biotopach, włączonych obecnie w granice miasta lub w środowiskach naturalnych położonych między obszarami zabudowanymi, wykazało wyraźny spadek liczebności (*Crex crex*, *Anthus pratensis*, *Anthus trivialis*, *Alauda arvensis*, *Motacilla flava*, *Lullula arborea*, *Perdix perdix*, *Vanellus vanellus*, *Rallus aquaticus*, *Porzana porzana*, *Locustella luscinioides*, *Jynx torquilla*, *Streptopelia turtur*, *Muscicapa striata* i *Luscinia luscinia*).

Gatunkami zagrożonymi na terenie miasta, które w bliskim czasie mogą wycofać się z Olsztyna są ptaki gnieźdzące się w niewielkiej liczbie par, w zagrożonych zmianami biotopach np. *Anas crecca* (3 p), *Anas strepera* (4p), *Gallinula chloropus* (3p), *Tringa ochropus* (8p), *Scolopax rusticola* (6p), *Caprimulgus europaeus* (7p), *Columba oenas* (4p), *Lanius collurio* (50p) i *Lullula arborea* (13p).

W przeciwieństwie do gatunków wykazujących spadek liczebności w ostatnich 25 latach do zespołu lęgowego Olsztyna przybyło 5 gatunków (tab. 2), a 11 wykazało istotny wzrost liczebności (tab. 3). Wytworzyła się także lokalna grupa jaskółki dymówki *Hirundo rustica* gnieźdząca się w centrum miasta na strychach budynków.

Do przemian w awifaunie miasta należy również zmiana struktury dominacyjnej zespołu ptaków zajmujących obszar zabudowy miejskiej. Dawniej, na przełomie lat sześćdziesiątych i siedemdziesiątych najliczniejszymi gatunkami tworzącymi lęgowy zespół obszaru zabudowanego były: *Passer domesticus*, *Apus apus*, *Sturnus vulgaris*, *Carduelis chloris*, *Passer montanus*, *Fringilla coelebs*, *Phoenicurus phoenicurus*, *Parus major*, *Pica pica* i *Serinus serinus* (Okulewicz 1971). Dzisiaj najliczniejszymi gatunkami dla tego samego obszaru są kolejno według dominacji: *Passer domesticus*, *Streptopelia decaocto*, *Columba livia f. domestica*, *Apus apus*, *Pica pica*, *Parus major*, *Fringilla coelebs*, *Sturnus vulgaris*, *Phoenicurus phoenicurus* i *Carduelis chloris*.